



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 700



Certificate of Analysis SETOC 700

General Information

In this report an overview is given of analytical data for this sample collected in our proficiency testing program. The consensus values are calculated using a robust statistical model. With this NDA model, the mean and standard deviation are calculated using all reported data when at least 4 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into two sections: Consensus Values and Indicative Values. The division is made on the reliability of the data. Consensus Values are based on at least 8 results and a maximum relative uncertainty of 6.25%. Indicative Values are based on a maximum relative uncertainty of 35% and a minimum of 4 and maximum of 7 results, or a relative uncertainty greater than 6.25% when there are at least 8 results.

For each determinand the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median, MAD (Median of Absolute Deviation), the uncertainty of the mean (consensus or indicative) value and the relative uncertainty.

Please note: Most WEPAL-QUASIMEME reference materials are found to be stable over the long term (>10 years) for most determinand/matrix combinations. There are a few exceptions known to us as being less stable over the long term. These are organotins in sediment (MS6), ASP in shellfish (BT7), some PAHs and PCBs in sediment (SETOC) and N-NH₄ (as N) in clay soils (ISE).

All values, expressed on a weight basis (kg or %), are reported as oven-dried (105°C) material. Moisture is reported in the material as received.

Sample information

WEPAL reference materials are from natural sources only. There is no spiking, mixing or other alterations of the samples. For sample preparation, the SETOC samples are dried at 40°C and milled to pass a 0.5 mm sieve.

This SETOC sample 700 of Soil from polluted area, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 7 periods (or rounds). Only results from the last 5 periods are used. This way, the consensus values reflect the latest 'state of the art' analytical techniques used by the laboratories. The results on which the values in this report are based were taken from the periods given in the following table:

Year	Round	Number
2026	1	3
2024	1	4
2023	3	2
2020	4	3
2017	4	4



Consensus Values SETOC 700

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
naphthalene	µg/kg	51.7	23.5	45.4	101	59.0	16.3	2.92	5.65
acenaphthene	µg/kg	11.5	3.04	26.5	65	11.4	1.80	0.472	4.10
fluorene	µg/kg	12.7	4.22	33.3	69	13.0	2.61	0.635	5.01
phenanthrene	µg/kg	136	28.5	21.0	127	140	20.4	3.17	2.33
anthracene	µg/kg	29.0	6.82	23.5	108	29.3	4.34	0.820	2.83
fluoranthene	µg/kg	211	35.6	16.8	130	210	21.1	3.90	1.84
pyrene	µg/kg	158	25.1	15.9	110	156	15.9	3.00	1.90
chrysene	µg/kg	123	23.1	18.7	126	122	15.0	2.57	2.09
benz(a)anthracene	µg/kg	113	21.0	18.5	128	115	12.3	2.32	2.05
benzo(b)fluoranthene	µg/kg	137	28.6	20.9	104	139	19.1	3.51	2.56
benzo(k)fluoranthene	µg/kg	61.8	12.0	19.5	124	63.0	8.20	1.35	2.19
benzo(a)pyrene	µg/kg	103	19.0	18.4	126	104	12.0	2.12	2.05
dibenz(ah)anthracene	µg/kg	24.7	5.10	20.6	89	25.0	3.00	0.675	2.73
indeno(1,2,3-cd)pyrene	µg/kg	86.1	14.7	17.0	122	85.8	8.44	1.66	1.93
benzo(ghi)perylene	µg/kg	85.9	13.7	15.9	124	86.4	8.56	1.53	1.79
EPA ΣPAH(16)	µg/kg	1351	229	16.9	78	1352	151	32.4	2.40

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 028	µg/kg	1.44	0.540	37.4	93	1.46	0.360	0.070	4.85
PCB 052	µg/kg	5.37	1.34	24.9	115	5.29	0.790	0.156	2.91
PCB 101	µg/kg	8.39	1.77	21.2	117	8.34	1.21	0.205	2.45
PCB 105	µg/kg	1.90	0.183	9.7	22	1.90	0.105	0.049	2.57
PCB 118	µg/kg	5.51	0.850	15.4	110	5.53	0.540	0.101	1.84
PCB 128	µg/kg	1.75	0.357	20.4	17	1.80	0.200	0.108	6.18
PCB 138	µg/kg	10.1	2.72	26.8	118	10.2	1.64	0.313	3.08
PCB 149	µg/kg	10.3	1.34	13.0	15	10.2	0.800	0.433	4.21
PCB 153	µg/kg	8.93	2.31	25.8	117	8.99	1.69	0.267	2.98
PCB 180	µg/kg	8.29	2.00	24.1	115	8.49	1.32	0.233	2.81
ΣPCB(7)	µg/kg	49.6	8.58	17.3	58	49.3	5.15	1.41	2.84

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
hexachlorobenzene	µg/kg	5.90	1.39	23.6	28	5.66	0.852	0.328	5.56
1,2,3,4 tetrachlorobenzene	µg/kg	2.32	0.365	15.7	15	2.26	0.404	0.118	5.06
1,3,5 trichlorobenzene	µg/kg	1.79	0.303	16.9	16	1.83	0.183	0.095	5.29
p,p'-DDD	µg/kg	0.636	0.134	21.1	18	0.614	0.082	0.039	6.21



Consensus Values SETOC 700

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, GC	mg/kg	43.5	18.3	42.0	96	44.2	12.1	2.33	5.36
Organic carbon	g/kg	10.0	1.23	12.3	63	10.2	0.655	0.194	1.93

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	11.1	1.21	10.9	59	11.1	0.840	0.197	1.77
Cd	mg/kg	0.641	0.074	11.5	57	0.650	0.050	0.012	1.90
Cr	mg/kg	28.7	3.94	13.7	61	28.9	2.60	0.631	2.20
Cu	mg/kg	17.8	1.58	8.9	62	17.9	0.900	0.251	1.41
Hg	mg/kg	0.423	0.059	14.0	54	0.426	0.035	0.010	2.38
Ni	mg/kg	11.4	1.25	11.0	62	11.2	0.717	0.199	1.75
Pb	mg/kg	37.2	3.17	8.5	61	37.3	2.19	0.507	1.36
Zn	mg/kg	144	14.8	10.3	61	143	8.40	2.37	1.64
Ba	mg/kg	79.0	8.62	10.9	42	80.0	5.57	1.66	2.10
Co	mg/kg	4.35	0.433	10.0	48	4.35	0.250	0.078	1.80
Sn	mg/kg	1.83	0.168	9.2	8	1.89	0.083	0.074	4.06

Method: Dibenzo-P Dioxin

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DD	ng/kg	4.06	0.427	10.5	9	4.04	0.160	0.178	4.38

Method: Dibenzofuran

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
1,2,3,4,7,8 Cl6DF	ng/kg	12.6	1.72	13.6	9	13.0	1.00	0.715	5.67

Indicative Values SETOC 700

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
acenaphthylene	µg/kg	11.6	4.93	42.5	62	12.6	3.42	0.782	6.74
VROMΣPAH10	µg/kg	1034	307	29.7	7	983	167	145	14.0

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 031	µg/kg	1.18	0.243	20.6	13	1.25	0.150	0.084	7.16
PCB 156	µg/kg	0.740	0.164	22.1	11	0.740	0.107	0.062	8.34
PCB 077	µg/kg	0.132	0.036	27.2	8	0.142	0.024	0.016	12.0
PCB 081	µg/kg	0.006	0.000	6.9	5	0.006	0.000	0.000	3.86
PCB 114	µg/kg	0.098	0.016	16.2	7	0.099	0.010	0.008	7.66
PCB 123	µg/kg	0.079	0.029	36.2	7	0.083	0.018	0.014	17.1
PCB 157	µg/kg	0.527	0.277	52.5	7	0.600	0.220	0.131	24.8
PCB 167	µg/kg	0.376	0.156	41.6	8	0.371	0.081	0.069	18.4
PCB 189	µg/kg	0.201	0.052	25.9	8	0.218	0.028	0.023	11.5

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
hexachlorobutadiene	µg/kg	0.437	0.090	20.7	4	0.429	0.049	0.056	12.9
pentachlorobenzene	µg/kg	1.26	0.424	33.6	20	1.29	0.269	0.118	9.40
1,2,3 trichlorobenzene	µg/kg	0.572	0.179	31.3	8	0.576	0.121	0.079	13.8
1,2,4 trichlorobenzene	µg/kg	5.54	1.44	26.0	17	5.85	0.633	0.437	7.88
beta-HCH	µg/kg	0.121	0.045	36.9	4	0.131	0.024	0.028	23.1
isodrin	µg/kg	33.8	10.2	30.1	26	34.3	6.34	2.49	7.37
aldrin	µg/kg	191	67.9	35.6	34	195	44.7	14.6	7.63
dieldrin	µg/kg	3313	1034	31.2	34	3335	684	222	6.69
endrin	µg/kg	277	114	41.0	33	291	86.7	24.7	8.92
telodrin	µg/kg	23.2	8.46	36.5	22	22.3	5.93	2.26	9.72
p,p'-DDT	µg/kg	1.09	0.599	55.1	22	1.35	0.440	0.160	14.7
p,p'-DDE	µg/kg	0.586	0.516	88.1	14	0.760	0.450	0.172	29.4
o,p'-DDD	µg/kg	0.721	1.64	227.2	9	3.44	3.07	0.682	94.7
Sum trichlorobenzenes	µg/kg	7.89	2.37	30.0	5	7.88	1.53	1.32	16.8
Sum tetrachlorobenzenes	µg/kg	3.45	1.22	35.4	5	3.38	0.671	0.685	19.8

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
EOX	mg/kg	2.93	1.19	40.7	21	3.10	0.840	0.325	11.1
Inorganic carbon	g/kg	5.83	2.35	40.4	8	5.97	1.76	1.04	17.8

Indicative Values SETOC 700

Method: Other parameters									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Particles < 2 µm	%	4.58	5.38	117.5	14	5.99	3.49	1.80	39.3
Particles < 63 µm	%	13.4	4.32	32.2	19	14.5	2.25	1.24	9.24
Particles > 63 µm	%	74.0	17.1	23.1	14	76.3	11.3	5.71	7.72
CN - Total	mg/kg	0.681	0.302	44.4	20	0.750	0.166	0.084	12.4
CN - Free	mg/kg	0.767	0.166	21.7	5	0.800	0.100	0.093	12.1
Particles < 50 µm	%	13.8	3.06	22.1	5	14.9	1.77	1.71	12.4
Method: Metals									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mo	mg/kg	0.246	0.124	50.3	20	0.283	0.073	0.035	14.1
Sb	mg/kg	0.470	0.087	18.5	6	0.478	0.045	0.044	9.45
V	mg/kg	16.5	4.15	25.2	9	16.9	2.22	1.73	10.5
Method: Dibenzo-P Dioxin									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
1,2,3,7,8 Cl5DD	ng/kg	0.454	0.131	28.9	4	0.460	0.061	0.082	18.1
1,2,3,7,8,9 Cl6DD	ng/kg	1.02	0.300	29.3	4	1.15	0.090	0.188	18.3
1,2,3,6,7,8 Cl6DD	ng/kg	1.21	0.558	46.1	6	1.32	0.320	0.285	23.5
1,2,3,4,6,7,8 Cl7DD	ng/kg	18.0	7.83	43.5	9	19.0	5.00	3.26	18.1
Cl8DD	ng/kg	167	84.3	50.5	9	168	48.0	35.1	21.0
Method: Dibenzofuran									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DF	ng/kg	3.92	1.41	35.9	9	3.40	1.43	0.586	14.9
2,3,4,7,8 Cl5DF	ng/kg	3.52	0.762	21.7	8	3.48	0.500	0.337	9.57
1,2,3,7,8 Cl5DF	ng/kg	3.17	0.543	17.1	8	3.13	0.300	0.240	7.56
1,2,3,6,7,8 Cl6DF	ng/kg	4.90	1.32	27.0	8	5.10	0.765	0.585	11.9
2,3,4,6,7,8 Cl6DF	ng/kg	3.77	1.11	29.4	8	3.74	0.587	0.490	13.0
1,2,3,4,6,7,8 Cl7DF	ng/kg	58.9	22.2	37.7	9	59.0	12.0	9.25	15.7
1,2,3,4,7,8,9 Cl7DF	ng/kg	7.18	2.65	37.0	9	7.80	2.20	1.11	15.4
Cl8DF	ng/kg	259	78.0	30.1	9	260	60.0	32.5	12.6
Method: Experimental									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
DEHP	µg/kg	120	43.1	35.9	4	123	24.5	27.0	22.4